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PENYULUHAN DAN PELATIHAN TEKNOLOGI PEMBENIHAN DAN PENDEDERAN IKAN GABUS DI DESA SUNGAI BADAK, KABUPATEN MESUJI, PROVINSI LAMPUNG

Extension and Training of Snakehead Fish Breeding and Nursery Technology in Sungai Badak Village, Mesuji Regency, Lampung Province

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Kata Kunci :

Budidaya Gabus, Ovaprim, Hormon pertumbuhan, Pelatihan, Penyuluhan

Abstrak :

Pokdakan Maju Bersama Mesuji yang berlokasi di Desa Sungai Badak Kecamatan Mesuji Kabupaten Mesuji Lampung merupakan sekelompok masyarakat yang produktif secara ekonomi dan calon wirausaha dengan aktivitas budidaya ikan berupa pembesaran ikan konsumsi dan ikan lokal, khususnya ikan gabus. Masalah yang dihadapi dalam pengembangan budidaya ikan gabus di desa Sungai Badak Kabupaten Mesuji adalah terbatasnya ketersediaan benih dan lambatnya pertumbuhan ikan. Sehingga menyebabkan usaha yang dilakukan on-off atau mengalami rugi. Kegiatan ini bertujuan untuk meningkakan pengetahuan dan keterampilan anggota pokdakan dalam memproduksi benih gabus yang kontinyu dan berkualitasan secara mandiri dan menstimulasi terciptanya lapangan kerja. Kegiatan ini dilaksanakan melalui Focus Group Discussion, dan penyelenggaraan penyuluhan dan pelatihan teknologi pembenihan ikan gabus dan peningkatan pertumbuhan ikan gabus dengan aplikasi hormon pertumbuhan rekombinan. Peserta diberikan tes tertulis untuk mengukur seberapa sukses transfer teknologi tersebut. Hasil yang diperoleh dari kegiatan ini adalah pengetahuan dan keterampilan peserta pelatihan meningkat dari nilai rerata 58 menjadi 85 pada tranfer teknologi pembenihan (32%) dan meningkat dari nilai rerata 35 menjadi 66 pada transfer teknologi aplikasi hormon pertumbuhan rekombinan (31%) (skala 0-100). Meningkatnya nilai peserta ini diduga karena peserta sebagian besar adalah pembudidaya ikan yang sudah terbiasa melakukan kegiatan budidaya namun belum mengetahui dasar-dasarnya. Sehingga dengan adanya kegiatan ini diharapkan dapat meningkatkan perekonomian keluarga pembudidaya dan menjadikan Kabupaten Mesuji sebagai sentra ikan serta mendukung pertumbuhan ekonomi yang inklusif dan

berkelanjutan. Secara umum kedua transfer teknologi pada kegiatan ini dapat meningkatkan persentase pengetahuan dan keterampilan peserta sebesar 31,5% dan kegiatan ini berhasil.

Key word :

Snakehead culture, ovaprim, growth hormone, training, extension

Abstract :

Pokdakan Maju Bersama Mesuji, which is in Sungai Badak Village, Mesuji District, Mesuji District, Lampung, is a group of economically productive people and potential entrepreneurs with fish farming activities in the form of growing consumption fish and local fish, especially snakehead fish. The difficult problems in the development of snakehead culture in Sungai Badak village, Mesuji Regency, are the limited availability of seeds and the slow growth of fish. These cause the business to be carried out on-off or suffer losses. This community service aims to increase the knowledge and skills of pokdakan members in producing continuous and quality snakehead seeds independently and stimulate job creation. This activity was carried out through Focus Group Discussions, and organizing counseling and training on snakehead fish hatchery technology and increasing the growth of snakehead fish with the application of recombinant growth hormone. Participants were given a written test to measure how successful the technology transfer is. The results obtained from this activity were that the knowledge and skills of the trainees increased from an average score of 58 to 85 in hatchery technology transfer (32%) and increased from an average score of 35 to 66 in the transfer of recombinant growth hormone application technology (31%) (scale 0- 100). The increase in the value of these participants is presumably because most of the participants are fish cultivators who are used to carrying out aquaculture activities but do not know the basics. So that with this activity it is hoped that it can improve the economy of cultivator families and make Mesuji Regency a fish center and support inclusive and sustainable economic growth. In general, the two technology transfers in this activity increased the percentage of participants' knowledge and skills by 31.5% and this activity was successful.

Panduan sitasi / citation guidance (APPA 7th edition) :

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INTRODUCTION

The aquaculture sector has developed in the Mesuji Regency, Lampung Province, especially freshwater fish culture both in ponds and cages. Potentially aquaculture activities are strongly supported by natural resources in the form of 300 hectares of ponds and 4000 units of cages. Based on the profile data of the Department of Agriculture, Livestock and Fisheries of Mesuji Regency in 2016, it is known that utilization of ponds is still less than 10% (25.5 Ha) and cages less than 5% (70 units) as facilities of fish culture (Badan Pusat Statistik Kabupaten Mesuji, 2021). It indicates that there are still opportunities for the development of freshwater fish as well as local fish.

One of the local fish that is the potential to be cultured in Mesuji District is snakehead (Channa striata) considering that fish has a wide adaptability to water acidity (pH) between 4-7 (Freshwater Cultivation Fisheries Center Mandiangin, 2014) and this is in accordance with the topographical description of the Mesuji sub-district, including a swamp area which has a low acidity of water. Also, snakehead has several advantages high in amino acids, and a rich source of albumin about 6.224%

(Asfar et al., 2015; Nurilmala et al., 2020) which plays an important role in accelerating wound healing in postoperative patients (Shafri and Abdul, 2012; Hue et al., 2017). In addition, the cultivation of snakehead is a concrete step to fulfill market demand that continues to increase and has direct implications for high fishing activity, resulting in reduced stocks in the wild.

The Fish Culture Groups (POKDAKAN) "Maju Bersama Mesuji" located in Sungai Badak Village Mesuji District, is one of POKDAKAN that catch the opportunity to develop snakehead farming. However, the current problems are the limited availability of seeds and the slow growth of fish. These cause the business to be carried out on-off or suffer losses. Therefore, based on those problem illustrations, it is a challenge and an opportunity to increase knowledge and skills related to breeding and nursery technology in snakehead farming for members of POKDAKAN by conducting an extension and training.

The development of artificial breeding technology by inducing spawning using ovaprim is one of the innovations for providing fish seeds anytime. Ovaprim is a synthetic gonadotropin hormone that contains salmon gonadotropin-releasing hormone (sGnRHa) and anti-dopamine (DA). GnRH plays a role in stimulating the pituitary to release gonadotropin hormone (GtH) in the form of follicle-stimulating hormone (FSH, GtH I) and luteinizing hormone (LH, GtH II) (Schulz et al., 1995). FSH functions to regulate the process of yolk synthesis in females and the process of spermatogenesis in males. Meanwhile, LH regulates the final egg maturation and spermiation (Moberg et al., 1995; Mylonas & Zohar, 2001). These hormones have been applied successfully to induce the spawning of several fish such as nilem fish (Osteochilus vittatus) (Muchlisin et al., 2014), common carp (Cyprinus carpio) (Itishom, 2008), African catfish (Clarias gariepinus) (Ameer et al., 2021). Ovaprim has several advantages, for example, it is cheap, has many practical uses, and it is easy to find in the local market in Indonesia.

Besides, the nursery technology to increase the growth of snakehead seed has been proven to be carried out by the application of recombinant growth hormone (rGH) in both larva and juvenile stages with the artemia encapsulation method (2 mg/l enrichment media) and orally (2 mg/kg feed) up to 10% compared to controls (Vahira et al., 2020; Sarida et al., 2021). Recombinant growth hormone is a protein hormone with a polypeptide with a single chain measuring about 22 kDa which is produced by somatotropic cells in the anterior pituitary gland and has functions including regulating growth, reproduction, the immune system, and regulating osmotic pressure in teleost fish, as well as regulating metabolism in fish. These include lipolytic activity and protein anabolism in control vertebrates (Acosta et al., 2009; Rothan et al., 2014). Moreover, successful application of rGH for increasing growth in fish was observed in Anguilla bicolor (Handoyo et al., 2012), Litopenaeus vannamei (Saputra et al., 2015), and Chromobotia macracanthus (Permana et al., 2018).

The purpose of this Community Partnership Program (CPP) is to design partnership patterns to increase the potential of POKDAKAN through the application of technological innovations in providing fish seeds and facilitate partners with extension, practical activities, and assistance related to the production process. Therefore, this community service aims to increase the knowledge and skills of pokdakan members in producing continuous and quality snakehead seeds independently and stimulate job creation.

ACTIVITY METHOD

This community service activity was carried out on Wednesday, June 29^{th,} and July 26-27th, 2022, in Sungai Badak Village, Mesuji District. This village is a pilot project for developing Mesuji Regency as a fish center and establishing a snakehead village in Sungai Badak Village. The extension and training participants were members of the Maju Bersama Mesuji pokdakan, Marine and Fisheries Service of Mesuji District staff, and fishery instructors. The team tutors are a PKM team with a scientific background in the field of aquaculture and management.

The method in implementing this activity is Participatory Learning and Action (PLA) or participatory learning and practice, which is a new form of empowerment method formerly known as "learning by doing". So that in this activity the community will learn the theories of technology that will be applied and direct participatory practice in snakehead hatchery by applying breeding technology with semi-artificial spawning through induction of ovaprim hormone and application of recombinant growth hormone to increase the growth of snakehead which is slow through deepening and oral methods. Participatory Learning and Action is hoped that the community can explore and share knowledge in the context of decision-making materials, planning and implementing actions to bring change in a positive direction and improve the quality of life personally or in the community environment (Chamber, 2008). To measure the achievement of partners' knowledge and skills, as well as the success of achieving the objectives of the activity, an evaluation process is carried out before and after the activity. The evaluation process is carried out using achievement measurement tools in the form of questionnaires, as well as providing ongoing assistance to partners in Sungai Badak Village. The steps for implementing the activity consist of the initial stage, implementation stage, and final stage described as follows, while the flow of the method used in this activity is shown in **Figure 1.**

The initial stage

This stage includes Focus Group Discussion activities for consolidation and socialization of PKM activities that will be carried out starting from the type of technology transfer to be carried out, planning activity schedules, determining locations for training, and preparing facilities and infrastructure to be placed at pilot locations. Furthermore, the service team compiles the material to be delivered in the activity along with a questionnaire that will be used as an activity evaluation tool. The initial preparation stage ends with the preparation of tools and materials that will be used for demonstration activities and practice during the implementation of training activities.

Implementation stage

The training activity stage begins with the delivery of material for activities carried out by the lecture method. This stage is carried out by gathering partners such as POKDAKAN, Fisheries and Marine Center of Mesuji Regency staff, and fishery instructors, and then providing explanations about activity materials, sharing knowledge related to community empowerment, and conducting discussions with partners. The material presented was the innovation of snakehead breeding technology with semi-artificial spawning through the application of ovaprim hormone and nursery technology through the application of recombinant growth hormone to increase the slow growth of this fish through immersion and oral methods.

Next, the practice of two technologies is carried out which involves the participation of partners directly through demonstrations of the practice of breeding and nursery of snakehead, which is expected to provide real experiences in carrying out the two technologies to partners. The steps for breeding snakehead with the application of ovaprim are preparing mature broodstock, syringes, ovaprim, scales, containers, spawning containers, and substrates. The mature female gonads have visual characteristics on the abdomen that look more rounded, wide, and soft, while the male parent has a flat stomach and if stripped on the abdomen will release milt sperm. Furthermore, the female and male broodstock were weighed to calculate the dose of ovaprim to be given where the dose used was 0.5 ml/kg. Furthermore, the hormone was injected once intramuscularly and the broodstock was ready to be spawned with a female: male ratio of 1: 1 in a tarpaulin pond and given a substrate. While the nursery technology used recombinant growth hormone which was encapsulated in Artemia in detail the steps were 100 milliliters of Artemia nauplii were obtained by hatching 1 g of Artemia cysts, then transferred into one cup 50 mL. Then, artemia nauplii were mixed with 80 mL of mixed solutions containing 2 mg of rGH, 0.01% BSA, 0.9% NaCl, and 900 mL of water in each dark bottle. The process

of bioencaptulatin took one hour. After that Artemia nauplii were harvested, washed, and given to larvae. Artemia bioencapsulation of rGH was given twice a week in the morning for six weeks.

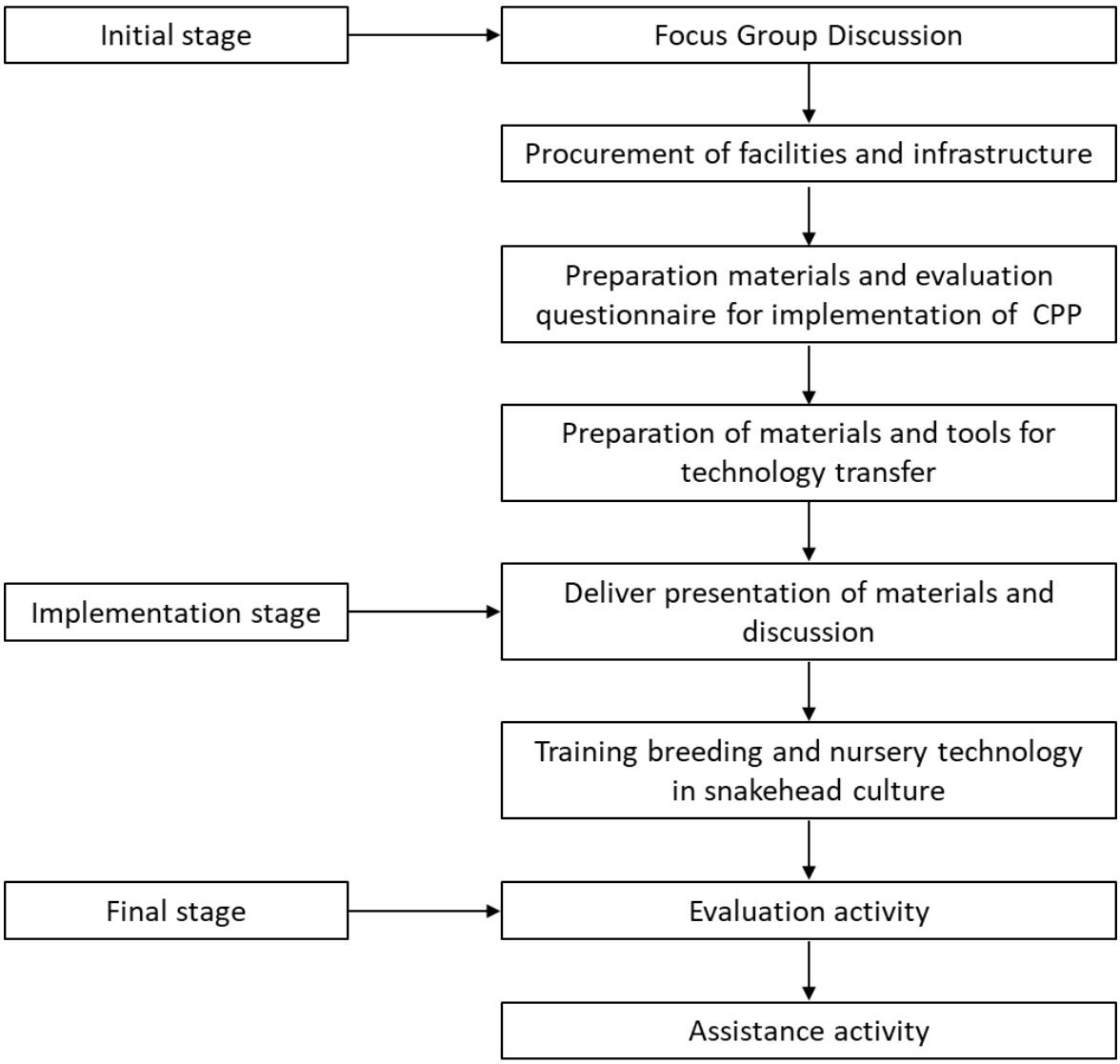

Figure 1. Activity implementation flow

The second method of giving rGH is oral which starts with weighing 2 mg of rGH, dissolved in 100 ml of Phosphate Buffered Saline (PBS), and stirring until completely mixed. The egg yolk that has been weighed as much as 20 grams is put into the solution and stirred again until it is completely mixed. The rGH solution was transferred to a sprayer that had been prepared. Further, one kg of feed was weighed and then placed in a basin and sprayed with rGH solution evenly. After that it was dried at room temperature, then the feed was transferred to plastic storage and stored in the refrigerator.

Final Stage

The final stage of this CPP includes evaluation and assistance activities. Evaluation activity was conducted at the beginning and at the end of the community service activity: an understanding level analysis of participants was carried out using a comparison of the pre-test (the initial evaluation) and post-test (the final evaluation stage). Both evaluations consist of ten questions with topics about artificial breeding technology by inducing spawning using ovaprim and nursery technology to increase

the growth of fish using rGH. Besides, apart from the results of the pretest and post-test, the success of this activity is also measured by the sustainability of activities to partners independently. While the assistance activity was carried out to provide guidance and consultation to partners related to the theme of the activity, the mentoring process is carried out after the completion of implementation training activities.

RESULT AND DISCUSSION

Implementation of training activities

The Focus Group Discussion activity successfully occurred at the Marine Fisheries Service of Mesuji Regency and was attended by 11 participants (**Figure 2a**). Based on consolidation and socialization of PKM activities with the Fisheries and Marine Service staff and representative member of Pokdakan Maju Bersama Mesuji, it is known that the main problems during snakehead culture are production factors such as availability of seeds, slow growth of fish, water treatment related to acidity (pH), natural feed, feed pellets and their management and marketing of fishery products produced. So that this year's CPP activities are focused on conducting extension and training related to snakehead fish breeding technology by conducting semi-artificial spawning with ovaprim and increasing the growth of snakehead fish with the application of recombinant growth hormone either by bioencapsulation or through feed (oral). In addition, this FGD activity also discussed activity plans and implementation time, procurement of facilities and infrastructure to practice technology transfer, and surveys for training locations.

Gambar 2. Focus Group Discussion PKM team with the Mesuji District Fisheries and Marine Service and representatives of POKDAKAN Maju Bersama Mesuji

One month later, the implementation of counseling and practice was carried out at the home of a member of the pokdakan with 28 participants. The extension material presented was about "Breeding and Nursery Technology of Snakehead Fish" (**Figure 3**). Before delivering the material, the PKM team first explored information about the level of participants' initial knowledge regarding the training theme by filling out questionnaires (pre-test). Filling out the questionnaire was done by choosing the correct answer from the questions asked. Then, the extension activity ended with a discussion session and filling out the post-test. Furthermore, the resource persons demonstrated semi-artificial spawning by injecting ovaprim hormones in female and male broodstock as an innovation in hatchery technology, and the application of recombinant growth hormone through artemia and feed for snakehead juveniles (**Figure 4** and **Figure 5**). Then, participants practiced following the demonstration given by the team.

Gambar 3. Tutors deliver the material of breeding and nursey technology of snakehead culture.

Gambar 4. Demonstration of injection of ovaprim intra-muscular on the Broodstock of snakehead

Gambar 5. Demonstration of preparing a solution for adding recombinant growth hormone into feed

Evaluation activity

Evaluation of the implementation of extension activities and innovative practices of breeding and nursery technology by the community service team and Pokdakan Maju Bersama Mesuji. There was a significant increase in the knowledge felt by the participants by conducting an extension process and demonstration of that technology. The results of a simple analysis of the ability of extension participants both at the beginning and at the end of the activity can be seen in **Figure 6.**

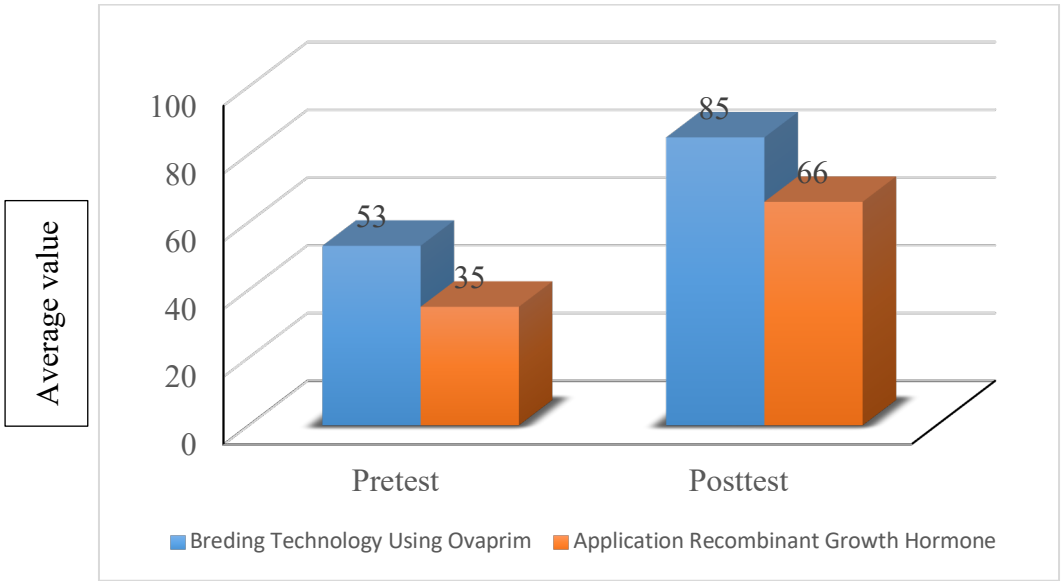

Figure 6. Participants' assessment results (pre-test and post-test)

The increase in knowledge can be observed from the increasing value of the answers to the pretest and posttest questions submitted by the service team. The pretest score on breeding technology using ovaprim averaged 53 and application recombinant growth hormone technology on nursery 35, increasing at the time of posttest with scores on technology transfer on an average of 85 and technology transfer two an average of 66. This result is quite satisfactory because the average posttest score has reached more than 70 for breeding technology using ovaprim. Meanwhile, in the application of recombinant growth hormone technology in nurseries even though the average post-test score has not reached 70, the increase is about 88.6%. Thus, from the pretest and posttest evaluation indicators, it can be concluded that this training activity has been successful. This is presumably because the participants are mostly fish farmers who may be used to doing aquaculture activities but don't know the basics yet.

Assistance activities

Mentoring activities are carried out after the training activity ends, which aims to provide consulting and discussion services for partners. Consultations carried out by the PKM team with partners were established by utilizing the Whatsapp messaging application. Apart from the results of the pretest and post-test evaluations, indicators of activity success are also measured by the sustainability of programs run by partners. This will be seen during the partner mentoring process after the training activity ends. From the results of the mentoring activities, partners represented by the Chair of POKDAKAN Maju Bersama Mesuji said that counseling and training on innovation in technology for breeding and nursery snakehead with ovaprim and recombinant growth hormone continued to be carried and shows satisfactory results where these activities were monitored directly by the Marine Fisheries Service of Mesuji Regency staff.

CONCLUSION AND SUGGESTION

Extension and training activities on the innovation of breeding and nursery technology of snakehead with ovaprim and recombinant growth hormone at Pokdakan Maju Bersama Mesuji to build Kampung Gabus in Sungai Badak Village, Mesuji Regency have succeeded in increasing the knowledge and skills of the participant. This success rate is indicated by the increase in the average pretest value for breeding technology, which was originally 53, then increased to 85, while the increase in the average pretest value for nursery technology, which was originally 35, then increased to 66, after participants participated in service activities. In addition, the success of this activity is also measured by the initiatives of partners who continue to carry out technology transfer activities and show satisfactory results.

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